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Testing Compression in an S-Series

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09-16-2003, 07:44 PM #1

Saturn-Eh!
Senior Member

Join Date: Jul 2003
Location: The Great White North
Posts: 1,715
[Saturn-Eh!'s Photos](#) 

Testing Compression in an S-Series
doing a compression test on an s-series is easy:

- 1) remove the fuel pump fuse, and start the car until it stalls. We want to remove any chance of fuel washing down the cylinder walls and skewing the results
- 2) reach down and unplug the connector(s) on the ignition coil (don't want to get a shocking result do we?)
- 3) remove sparkplugs
- 4) install compression tester on cylinder #1 and crank the engine over 10 times with the **gas pedal to the floor**. Saturn's s-series spec is ten cranks, most other manufacturers specify 3-4.
- 5) note the maximum reading, release the pressure in the compression tester, and repeat for the other three cylinders.

Saturn's should be between 180-210 psi, with no more than a 10psi difference between any two cylinders.

IE 180 180 180 180 is better than 180 200 205 200

even 165 165 165 165 isn't bad, as long as the cylinder readings are within 10psi of each other.

If you have a low cylinder(s) pour a tsp of engine oil into that cylinder and repeat the test. If the reading increases considerably, then the piston rings are not sealing well. If the reading stays about the same or has a minimal increase, then that cylinder has valve issues.

Note: it helps to have someone crank the engine while you watch the compression gauge. a cylinder that reaches 200psi on 3 cranks is much better than one that takes 10 cranks. watching the gauge while cranking is the only way to determine this...

Don't take compression readings to be gospel, as bad cams/lifters can still return good compression results. A running vacuum test is a good companion to a compression test when determining overall engine condition

REWARD EXCELLENCE!
 Rate the quality of this post and help *Saturn-Eh!* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

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09-17-2003, 12:16 AM #2

SLeepr
Master Member


Great post! Might I add that this should be performed when the engine is warm.

www.saturnfans.com/forums/showthread.php?t=24793

1/7

 Join Date: Oct 2002 Location: San Jose Posts: 2,461 Sleepr's Photos  	REWARD EXCELLENCE!  Rate the quality of this post and help <i>Sleepr</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
09-18-2003, 12:56 AM #3	
amazinghl Master Member Join Date: Jun 2002 Posts: 7,989 	 If Wolfman is here, he'd say you would want to test the engine COLD. Saturn-Eh!- That's funny, "(don't want to get a shocking result do we?)" Oh yeah Eh, you got PM. ... 85 GLH 367whp. http://www.saturnfans.com/forums/showthread.php?p=2261629#post2261629 00 Insight 72mpg REWARD EXCELLENCE!  Rate the quality of this post and help <i>amazinghl</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
09-18-2003, 02:57 AM #4	
Sleepr Master Member  Join Date: Oct 2002 Location: San Jose Posts: 2,461 Sleepr's Photos  	 I don't know why. Your compression numbers won't be totally accurate. It's even stated in the FSMs that the motor should be WARM.....don't burn yourself. REWARD EXCELLENCE!  Rate the quality of this post and help <i>Sleepr</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
09-18-2003, 08:28 PM #5	
wolfman Super Member  Join Date: Jun 2002 Location: Texas Posts: 12,066 wolfman's Photos  	 Quote: <i>Originally posted by amazinghl</i> If Wolfman is here, he'd say you would want to test the engine COLD. ANY engine will test higher WARM due to the thermal expansion of the pistons/cylinder walls and valves. I test COLD because I want to know what the engine is doing at it's WORST not it's best. (Even full blown AIDS patients have "good" days) Screwing things in and out of warm aluminum spark plug holes is also NEVER a good idea... ... Old Saturns never die, people KILL them, so check your damn oil! "Unthinking respect for authority is the greatest enemy of truth." Albert Einstein REWARD EXCELLENCE!  Rate the quality of this post and help <i>wolfman</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
09-18-2003, 08:55 PM #6	
Sleepr Master Member 	 Quote: <i>Originally posted by wolfman</i>



Join Date: Oct 2002
Location: San Jose
Posts: 2,461

[Sleepr's Photos](#)

ANY engine will test higher WARM due to the thermal expansion of the pistons/cylinder walls and valves. I test COLD because I want to know what the engine is doing at it's WORST not it's best. (Even full blown AIDS patients have "good" days) Screwing things in and out of warm aluminum spark plug holes is also NEVER a good idea...

From Saturn FSM Book Engine Mechanical, page 22:

Compression Check

1. Start the engine and allow it to reach normal operating temperature.
- 2, Shut engine off and disconnect the ignition module wiring harness plug.
3. Disconnect spark plug wires and remove all four plugs.
4. Insert compression gage bar kit SA9127E into the spark plug hole.
5. Fully open throttle (TBI and MFI)

IMHO, you aren't getting accurate numbers unless you are collecting information with your car at temp. Saturn's spec numbers represent the motor at temperature and wouldn't give you a reasonable unit of measure if you're gathering the information cold. I want to know what my car is doing when it's running under normal conditions. Once started, it doesn't stay cold long.

One of the very few times I disagree with you , Wolfman.

REWARD EXCELLENCE!



Rate the quality of this post and help *Sleepr* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!



09-18-2003, 09:23 PM

#2

Dr. Bob

Master Member

Join Date: Mar 2000
Location: SE Minnesota
Posts: 2,041



Dumb question... if you drive the vehicle to the retailer, how in the heck would the techs be able to do a compression check on a cold engine? Wouldn't the engine still be somewhat warm when they do the test, even if they let the car sit for a few hours?

Perhaps the warm (but not hot) Saturn specification reflects the reality that testing on a truly "cold" engine rarely happens?

From a tech perspective - what does a "cold" engine mean anyway? 🤔

REWARD EXCELLENCE!



Rate the quality of this post and help *Dr. Bob* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!



09-18-2003, 10:08 PM

#8

David 93 SL2m

Master Member



Join Date: May 2000
Location: North America
Posts: 3,594

[David 93 SL2m's Photos](#)

2004 VUE 2.2L
2007 ION-3 Sedan



Here is page 3-50 of the Chilton repair manual for 1991 - 1998 Saturns:

<http://home.comcast.net/~David96SC2/...-page-3-50.jpg>

In step two of the "Compression Test" section they wrote:

Quote:

Warm-up the engine to normal operating temperature, then shut the engine off.

And in bold letters they wrote:

Quote:

Be careful not to crosstread the spark plug hole.

The second paragraph under "Determining Engine Condition" has something interesting about excessive oil consumption:

Quote:

As a general rule, an engine that uses no more than one quart of oil every 1,000 miles is in good condition. Engines that use one quart or more in less than 1,000 miles should first be checked for oil leaks. If any oil leaks are present, have them fixed before determining how much oil is consumed by the engine, especially if blue smoke is not visible at the tail pipe.

...

Current

- 2004 VUE 124K
- 2007 ION3 112K

...

Past

- 1993 SL2 212K

	• 1993 SC2 140K • 1996 SC2 157K • 1996 SC2 126K • 2001 SC2, 145K • 2002 L200 20K • 2002 SL1 129K ...
REWARD EXCELLENCE!  Rate the quality of this post and help <i>David 93 SL2m</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!	

09-18-2003, 10:09 PM #9	
Saturn-Eh! Senior Member  Join Date: Jul 2003 Location: The Great White North Posts: 1,715 Saturn-Eh!'s Photos  	 I realize that the Saturn factory manual says "fully warmed up", but I tend to agree with wolfman, aluminum heads do not like plugs being removed when hot, for the same reason that the compression will test higher - thermal expansion. Having had to repair many spark plug threads both on and off the car (wanna pay for a head gasket because you yanked the plug when it was hot?) I'd have to say that I agree with "warm" but not "fully warmed up" Keep in mind that the same Saturn factory manual says that 1 quart in 1000 miles is completely normal oil consumption for a brand new s-series engine. FSM's are a valuable resource, but tech's in the field deal with day to day realities that are not always anticipated or documented by the engineers who write the Factory Manuals.
REWARD EXCELLENCE!  Rate the quality of this post and help <i>Saturn-Eh!</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!	

09-18-2003, 10:17 PM #10	
SLeepr Master Member  Join Date: Oct 2002 Location: San Jose Posts: 2,461 SLeepr's Photos  	 I totally agree. As I stated in my original post, make sure the car is WARM. I wasn't suggesting that you drive the car around the neighborhood until the fan kicks in. A minute or so is all it takes. My motor shows compression numbers of 165 165 165 165 when totally cold. These would be slightly out of range if I were to take them seriously. But, with a new motor, I know better. When warm, I get closer to 225 on all 4. I'm not trying to discount experience whatsoever. Wolfman has made me eat my words a number of times. But, I find that a WARM engine (not hot) provides more reliable and measurable data.
REWARD EXCELLENCE!  Rate the quality of this post and help <i>SLeepr</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!	

09-19-2003, 02:15 AM #11	
amazinghl Master Member  Join Date: Jun 2002 Posts: 7,989	 Quote: <i>Originally posted by SLeepr</i> From Saturn FSM Book Engine Mechanical, page 22: If you would open your owner manual to the page about spark plugs, you'll find "Do not remove the plugs when the engine is hot. Tighten the plus to a torque of 20 ft lb with the engine cold. Damage to teh spark plus thread can result if they are not properly replaced and torqued." At least that's what my 93 owner manual says. I know you said "warm" but how "warm" is hot? The idea of risking to damaging my plugs holes.... EEEEWWWWWW, I don't want to even think about it. I'll just need to know the COLD compression, thank you. ... 85 GLH 367whp. http://www.saturnfans.com/forums/showthread.php?p=2261629#post2261629 00 Insight 72mpg <i>Last edited by amazinghl; 09-19-2003 at 02:21 AM..</i>
REWARD EXCELLENCE! Rate the quality of this post and help <i>amazinghl</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank	

you!	
10-18-2003, 02:31 PM #12	
92saturnsl2 Advanced Member  Join Date: Jun 2002 Location: Colorado Springs, CO Posts: 712	Re: Testing compression in an s-series Quote: <i>Originally posted by Saturn-Eh!</i> doing a compression test on an s-series is easy: 1) remove the fuel pump fuse, and start the car until it stalls. We want to remove any chance of fuel washing down the cylinder walls and skewing the results Assuming the compression test is being done correctly, there is no need to remove the fuel pump fuse, or attempt to halt injector flow. When the engine is turning less than 400rpm, and the throttle is greater than 75%, the PCM will close the injector(s), and as such, cease fuel flow into the cylinders. Unless your TPS is screwy, fuel flow is automatically stopped when you try to start the car at WOT. REWARD EXCELLENCE! Rate the quality of this post and help 92saturnsl2 reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
12-04-2003, 02:28 AM #13	
sierrap615 Master Member  Join Date: Aug 2003 Location: Downers Grove, Illinois Posts: 2,538 sierrap615's Photos	i won't risk it, taking out a fuse isn't that hard. what if the engine started with the tester in? ... Formerly - Saturn of Downers Grove Parts Department Current - Castle Chevy in Villa Park Parts Department EPA 608 Certification EPA 609 Certification REWARD EXCELLENCE! Rate the quality of this post and help sierrap615 reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
12-04-2003, 08:01 AM #14	
92saturnsl2 Advanced Member  Join Date: Jun 2002 Location: Colorado Springs, CO Posts: 712	It won't start. The engine needs a spark to ignite the air/fuel mixture. (It won't start without ignition!) The point of pulling the fuel pump fuse is to cut fuel flow to prevent fuel from washing down the cylinder walls, skewing the results. By keeping the throttle wide open (which you should be doing anyways for the duration of the test) you are effectively cutting fuel flow (closing the injectors) for the duration of the procedure. Next time you go out to start your car, try it. If it's doing it's job, the car will NOT start at WOT, this is a method the PCM uses to clear a flooded engine. REWARD EXCELLENCE! Rate the quality of this post and help 92saturnsl2 reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!
12-04-2003, 09:41 AM #15	
SLeepr Master Member  Join Date: Oct 2002 Location: San Jose Posts: 2,461 SLeepr's Photos	Quote: <i>Originally posted by sierrap615</i> i won't risk it, taking out a fuse isn't that hard. what if the engine started with the tester in? Anyone remember the movie <i>Christine</i> ? REWARD EXCELLENCE! Rate the quality of this post and help SLeepr reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!



12-04-2003, 01:26 PM

#16

Saturn-Eh!

Senior Member



Join Date: Jul 2003
Location: The Great White North
Posts: 1,715

[Saturn-Eh!'s Photos](#)


Quote:

Originally posted by 92saturnsl2

The point of pulling the fuel pump fuse is to cut fuel flow to prevent fuel from washing down the cylinder walls, skewing the results. By keeping the throttle wide open (which you should be doing anyways for the duration of the test) you are effectively cutting fuel flow (closing the injectors) for the duration of the procedure.

Next time you go out to start your car, try it. If it's doing it's job, the car will NOT start at WOT, this is a method the PCM uses to clear a flooded engine.

I tend to disagree. WOT in any general motors vehicle with no speed input is affectionately referred to as "clear flood" mode, and will reduce the Pulse Width of the injectors by 75% - so you still get fuel. Go try it, put your foot to the floor the next time you start your saturn. If cold, the car will likely burp periodically, if warmed up, the car will likely start and go to 3500rpm...

now, let off the gas when going down hill, and the pcm will shut off the injectors entirely...

but for doing compression tests, you still need to disable the fuel in some way (fuse is my favorite).

REWARD EXCELLENCE!

Rate the quality of this post and help *Saturn-Eh!* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!



12-04-2003, 06:08 PM

#17

92saturnsl2

Advanced Member



Join Date: Jun 2002
Location: Colorado Springs, CO
Posts: 712

</



Join Date: Oct 2002

Location: San Jose

Posts: 2,461

[Sleepr's Photos](#)



distributor????????

REWARD EXCELLENCE!

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10-12-2005, 07:00 PM

#20

[SimPlyxTriPPiN](#)

Member



Join Date: Aug 2004

Location: southern california

Posts: 477

[SimPlyxTriPPiN's Photos](#)

1995 SC1

1997 SL2



Re: Testing Compression in an S-Series

haha. sry bout that. when he said ignition coil, i interpreted it as wires. i got it now. thanks anyways bud.

REWARD EXCELLENCE!

 Rate the quality of this post and help *SimPlyxTriPPiN* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

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Engine Compression Testing	justinflo200	S-Series Tech	17	09-18-2007 12:13 PM
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